



Making the Most of Mobile Welcome!

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<http://www.cl.cam.ac.uk/~jac22/horizon/24.9.12/>



Local Information

- Fire/Safety
- Bathroom info
- WiFi: "wgb"
- Taxi: 01223 715715



Where to now?

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Onloading/Offloading

- We need a generic open architecture
- To ease sharing resources between
 - Fixed and wireless broadband
 - 3/4G & WiFi
 - I-D management/payment/contract models
 - Resource pooling
 - multipath not just MIMO
- Offloading code/all or parts of apps
 - To cloud or to home hub or work...



Cross provider/Cross Layer Resource Pooling

- We have bonding across providers
 - LTE allows pooling/sharing cell tower/Aps
 - Have L2 bonding (e.g. Brand)
 - Have Mid Box Bonding (e.g. Viprinet)
 - Have App Bonding (e.g. OpenGarden)
 - Have work on on/offloading...
- But we also want to resource pool in Cloud/Web Service
 - Meeting constraint of tenants' spec for SLA
 - Doing this with fast live migration...
- And joint optimise net+app layer
 - 3/4 party problem - hard business case
 - Needs some isolation/schedule



A word about multipath IP/TCP

- Based on resource pooling model
 - Respects congestion in different paths dynamically
 - Have code for all three main OS
 - Two killer deployment
 - Handset
 - Datacenter
 - Graceful "handover"
 - Not Migration (until IPv6 :-)



Web/Cloud protocols are profligate

- We've just adopted all the fixed line protocols
 - But TCP/HTTP etc are appallingly profligate
 - SPDY etc are only point solutions
 - Plus don't do multipath well
 - Plus bufferbloat needs removing somehow
 - Add your favourite broken Internet protocol <here>
- Middlebox TCP hacks abound
 - Might get messed by new TCP (TCPcrypt)
 - Might get messed by other transport
 - When is multipath ip/tcp ready for prime time?



Making the users life easier

- Tricks like signpost (see poster)
 - Asymmetry
- Connectivity glitches
 - Across domains (work/home/car)
- Security
 - Device id/loc on multiple net device ...
- Understanding bills (no surprises)
- Ease of use of net/account management
 - Expectations
 - Multi-sim/roaming sim devices not seamless yet
- Enterprize case looks like its done, though



Power management

- We're on the lower limit of battery life
 - Don't do things to make it worse
 - Like sending too many repeated adverts to fone
 - Can do a lot better
 - See our work on ad caching
 - and on better management of A-GPS etc
 - Irony was Apple/iPhone moved problem from cellular provider centric to handset OS vendor-centric, partly
 - But not completely as radio and h/w device/driver level are opaque to OS vendor and to Application developer
 - Big problem for severely sub-optimal app/os/net interactions (e.g. keeping radio at high power level unnecessarily)



Take Homes

- Speakers -send us slides, if it is ok for us to publish
 - Attendees - we will produce a workshop report too
 - Roadmap?
 - Products, Services?
 - Regulatory/Economic changes?
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- Further discussion in the hostelry of choice
 - The Castle, on Castle Hill (see <http://www.cl.cam.ac.uk/~jac22/horizon/24.9.12/> For walking route...weather looks less dreadful just now :-)